

## ABSTRACT

Disclosed are a group III-nitride semiconductor substrate and a production method therefor. A group III-nitride semiconductor substrate having an element-forming surface with a dislocation density of  $10^7 \text{ cm}^{-2}$  or less in its entirety is formed only two steps. In a first step, a AlGaN-based low-temperature buffer layer is formed on a  $\text{ZrB}_2$  single crystal base having a defect density of  $10^7 \text{ cm}^{-2}$  or less, at a base temperature allowing the low-temperature buffer layer to be grown or deposited on the  $\text{ZrB}_2$  single crystal base substantially without creation of any  $\text{Zr} - \text{B} - \text{N}$  amorphous nitrided layer. Subsequently, in a second step, an AlGaN-based single crystal film is grown directly on the low-temperature buffer layer. The present invention can fully bring out the properties of the  $\text{ZrB}_2$  single crystal base having a high potential as a base material capable of lattice marching with group III-nitride semiconductors, so as to achieve a high-quality AlGaN semiconductor layer with an element-forming surface having a low dislocation density, through a fully simplified process.